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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,971	09/25/2003	David W. Gish	ITL.1574US (P17016)	8875
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No. 10/671,971	Applicant(s) GISH ET AL.	
	Examiner Faisal Zaman	Art Unit 2111	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-9,11,12,15,16,18,20,21 and 23-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15 and 16 is/are allowed.
- 6) ☒ Claim(s) 1,4,6,7,9,12,18,21 and 23-25 is/are rejected.
- 7) ☒ Claim(s) 5,8,11 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 February 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claims 7, 9, 18, and 20** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claims 7 and 18, the claims state that the comparator is to decrement the accumulator value "if the resulting accumulator value would be *greater than zero*, otherwise the comparator is to decrement the accumulator value to zero." However, the portion of the specification for which this limitation is supported states that "if decrementing the winning bidder's accumulator value would result in a *negative value*, then, the accumulator value is set to zero." Specification, Page 6, lines 14-15. In other words, if the resulting accumulator value is *not negative*, the comparator is to decrement the accumulator value by an amount corresponding to the weight value associated with the accumulator. Therefore, the examiner presumes, for examination purposes, that the claims should state "if the resulting accumulator value would be greater than **or equal to zero**", since zero itself is not a negative number.

Claims 9 and 20 are rejected due to a dependency.

Appropriate corrections are therefore required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. **Claims 1, 4, 6, 7, 9, 12, 21, and 24** are rejected under 35 U.S.C. 102(e) as being anticipated by Kato (U.S. Patent No. 6,961,793).

Regarding Claim 1, Kato discloses a method for arbitrating a resource comprising:

Setting n weight values for n bidders in a corresponding one of n registers (Figure 4, item 50, Column 5, lines 5-7; Column 6, lines 13-16; Column 7, lines 36-44; where the “basic priority data” is equivalent to the n weight values and “plurality of bus masters” is equivalent to the n bidders);

Setting n accumulator values for the n bidders in a corresponding one of n accumulators (Figure 4, items $60_1 - 60_n$), wherein the n accumulator values are based at least in part on the n weight values (Column 5, lines 7-13; Column 6, lines 16-20; where the “arbitration priority data” for the plurality of bus masters is equivalent to the “ n accumulator values for n bidders” since the arbitration priority data is an accumulation of the basic priority data and request indication data of the various bus masters);

Granting one of the n bidders to receive access to the resource based at least in part on the accumulator value (Column 5, lines 13-23; Column 6, lines 20-25), and then decrementing the selected bidder's accumulator value in the selected bidder's accumulator (Column 5 line 66 – Column 6 line 5; also Column 10 line 57 – Column 12 line 6, or Column 12 lines 7-60); and

Incrementing the accumulator value in the $n-1$ losing bidders' accumulators by one of a plurality of predetermined values (e.g. 0 to 7) based on the accumulator value with respect to one of a plurality of portions of a range of accumulator values in which the corresponding $n-1$ losing bidder's accumulator value is present, wherein a probability of the $n-1$ losing bidders for accessing the resource is increased based on a respective standing of the accumulator value within the accumulator values for the $n-1$ losing bidders (Column 10, lines 62-67 and Column 12, lines 13-15; ie. by increasing the priority for each of the losing bidders/masters in each cycle, the probability of that master having access granted in the next cycle increases).

Regarding Claim 4, Kato discloses wherein the accumulator values (ie. the arbitration priority data) are initially set to a midpoint of the range of accumulator vlaues (Column 5, lines 5-13).

Regarding Claim 6, Kato discloses an apparatus to arbitrate access to a resource comprising:

A plurality of n registers to store n weight values (Figure 4, item 50, Column 7, lines 36-44; ie. where $PRIBASE_i$ is equivalent to the n weight values);

A plurality of n accumulators (Figure 4, items $60_1 - 60_n$) to each receive a request (Figure 4, item $REQ_1 - REQ_n$) to the resource and to accumulate and store n accumulator values, wherein the n accumulator values are based at least in part on the n weight values (Column 5, lines 7-13; Column 6, lines 16-20; where the "arbitration priority data" for the plurality of bus masters is equivalent to the " n accumulator values for n bidders" since the arbitration priority data is an accumulation of the basic priority data and request indication data of the various bus masters);

A comparator, coupled to the plurality of accumulators, to grant access to one of the requests based at least in part on the past history of granted requests and the n accumulator values (Figure 4, item 62, Column 8, lines 39-46), wherein each accumulator is to increment or decrement the accumulator value on a per arbitration cycle basis in response to the grant access by the comparator (Column 10, lines 62-67).

Regarding Claims 7 and 21, Kato discloses wherein the comparator is to decrement the accumulator value of the accumulator that was granted access to their request in an amount corresponding to the n weight value associated with the accumulator if the resulting accumulator would be greater than or equal to (see 35 USC 112, second paragraph rejection above) zero, otherwise the comparator is to decrement the accumulator value to zero (Column 5 line 66 – Column 6 line 5; also Column 10 line 57 – Column 12 line 6, or Column 12 lines 7-60).

Regarding Claim 9, Kato discloses wherein the weight value (ie. the basic priority data) is initially set according to a priority of the request (ie. from the bus master) (Column 8, lines 50-53).

Regarding Claim 12, Kato discloses wherein the resource may be an interconnect bus (Column 7, lines 21-23), memory unit, or output buffer.

Regarding Claim 24, Kato discloses wherein each of the plurality of n registers (Figure 4, item 50) is coupled to a corresponding one of the plurality of n accumulators (Figure 4, items $60_1 - 60_n$).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 18, 23, and 25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato and Dao et al. ("Dao") (U.S. Patent No. 6,915,369).

Regarding Claim 18, Kato teaches a system comprising:

A processor (Kato, Column 7, lines 24-26);

A plurality of bidders to access a resource (Kato, Figure 4, items $20_1 - 20_n$);

An arbitration logic with a plurality of n registers to store n weight values (Kato, Figure 4, item 50, Column 7, lines 36-44; ie. where $PRIBASE_i$ is equivalent to the n weight values);

A plurality of n accumulators to accumulate and store n accumulator values (Kato, Figure 4, items $60_1 - 60_n$) and to each receive a request (Kato, Figure 4, item $REQ_1 - REQ_n$) from the plurality of bidders, wherein the n accumulator values are based at least in part on the n weight values (Kato, Column 5, lines 7-13; Column 6, lines 16-20; where the "arbitration priority data" for the plurality of bus masters is equivalent to the " n accumulator values for n bidders" since the arbitration priority data is an accumulation of the basic priority data and request indication data of the various bus masters);

A comparator, coupled to the plurality of n accumulators, to grant access to one of the requests based at least in part on the past history of granted requests and the n accumulator values (Kato, Figure 4, item 62, Column 8, lines 39-46), wherein the arbitration logic is to decrement the accumulator value of the accumulator associated with the bidder that was granted access to its request in an amount corresponding to the weight value of the corresponding bidder if the resulting accumulator value would be greater than or equal to (see 35 USC 112, second paragraph rejection above) zero, otherwise the arbitration logic is to decrement the accumulator value to zero (Kato, Column 10, lines 62-67 and Column 12, lines 47-51; i.e., the minimum value for a basic priority is zero).

Kato does not expressly teach a dynamic random access memory, coupled to the processor; and

Wherein the n weight values and n accumulator values are to be configured by a user.

In the same field of endeavor (e.g. arbitration of a resource between multiple requestors), Dao teaches a dynamic random access memory (Dao, Figure 1, item 106), coupled to a processor (Dao, Figure 1, item 104); and

Wherein requestor priority values are to be configured by a user (Dao, Column 6, lines 21-38).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Dao's teachings of arbitration of a resource between multiple requestors with the teachings of Kato, for the purpose of increasing the flexibility of the system by allowing the user to adjust the priorities of the bus masters according to the user's needs.

Regarding Claims 23 and 25, Dao teaches enabling a user to set the priority values of the requestors (Dao, Column 6, lines 21-38).

The motivation that was used in the combination of Claim 18, *super*, applies equally as well to Claim 23.

Allowable Subject Matter

7. **Claims 15 and 16** are allowed.

8. **Claims 5, 8, 11, and 20** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

Regarding Claims 5, 8, 15, and 20, the prior art of record does not teach wherein the range of values is based on a quartile, the accumulator value is incremented by one if the accumulator value is within 76-99% of the range, the accumulator value is incremented by two if the accumulator value is within 51-75% of the range, the accumulator value is incremented by three if the accumulator value is within 26-50% of the range, the accumulator value is incremented by four if the accumulator value is within 0-25% of the range.

Claims 11 and 16 are allowable due to a dependency.

Response to Arguments

10. Applicant's arguments, see page 7, filed 8/2/2007, with respect to Claim 15 have been fully considered and are persuasive. The rejection of Claim 15 has been withdrawn.

11. Applicant's arguments filed 8/2/2007 with regards to Claims 1, 6, and 18 have been fully considered but they are not persuasive.

With regards to Claim 1, Applicant argues that "Kato nowhere teaches, at least, incrementing an accumulator value for losing bidders by one of multiple predetermined

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values based on the accumulator value for a given accumulator with respect to a given one of a range of accumulator values in which the accumulator value is present”, and further “in the schemes disclosed in Kato there is no incrementing an accumulator value..., instead in each bus cycle another priority value is stored.” The examiner respectfully disagrees. Contrary to Applicant's argument, in Column 10, lines 62-67 of Kato, incrementing of accumulator values is clearly disclosed (“the basic priority data of each master is *incremented by one for every comparing timing* [i.e., each arbitration cycle]...”). Further, the “one of multiple predetermined values” is one of the range of values from 0-7, as described in the above citation.

With regards to Claim 6, Applicant argues that “Kato fails to teach or suggest that each accumulator value is to increment or decrement its accumulator value on a per arbitration cycle basis in response to a grant access.” The examiner respectfully disagrees. Contrary to Applicant's argument, Kato does in fact teach this limitation, see Column 10, lines 62-67 (“the basic priority data of each master is *incremented by one for every comparing timing* [i.e., each arbitration cycle], and after the basic priority data reaches ‘7’ as the highest basic priority data, it returns to ‘0’ as the minimum basic priority data [i.e., it is decremented to the lowest value]”).

With regards to Claim 18, Applicant argues that “the cited art nowhere teaches or suggests that [the] accumulator value associated with a granted bidder is decremented by an amount corresponding to its weight value if the resulting accumulator value would be greater than (“or equal to”, see 35 USC 112, second paragraph rejection above) zero, otherwise the accumulator value is decremented to zero.” The examiner

respectfully disagrees. Contrary to Applicant's argument, Kato teaches the argued limitation, see Column 10, lines 62-67 (as described above) and further Column 12, lines 47-51 ("the basic priority data *immediately after having acquired the bus usage right* becomes the *minimum* value of '0' [i.e., the basic priority data cannot be a negative value]").

Therefore, the claims stand as previously rejected.

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Faisal Zaman whose telephone number is 571-272-6495. The examiner can normally be reached on Monday thru Friday, 8 am - 5:30 pm, alternate Fridays off.


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Rinehart can be reached on 571-272-3632. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

FMZ

Faisal Zaman
Examiner
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